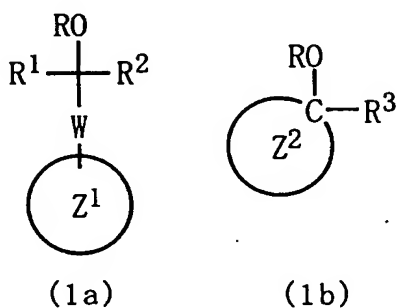
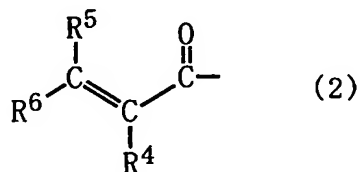


## CLAIMS

1. A fluorine-atom-containing polymerizable  
unsaturated-monomer represented by the following formula (1a)  
5 or (1b):



wherein each of a ring  $Z^1$  and a ring  $Z^2$  is an alicyclic carbon  
ring; when the alicyclic carbon ring is multi-cyclic, a part  
of atoms constituting the ring may be substituted by an oxygen  
atom, a sulfur atom or a nitrogen atom; an atom constituting  
10 the ring  $Z^1$  or the ring  $Z^2$  may have a substituent; each of  $R^1$ ,  $R^2$   
and  $R^3$  is an alkyl group or a fluoroalkyl group; W denotes a  
single bond or a combining group and R is an unsaturated acyl  
group represented by the following formula (2):



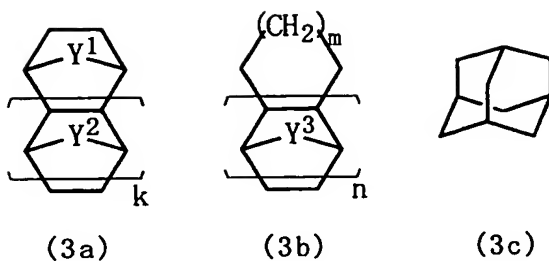
15 wherein each of  $R^4$ ,  $R^5$  and  $R^6$  is a hydrogen atom, a fluorine  
atom, an alkyl group or a fluoroalkyl group; a carbon atom  
bonded by at least one hydrogen atom exists in an adjacent

position to the carbon atom bonded by an RO- group represented by the formula (1a) and the formula (1b); provided that at least one of  $R^1$ ,  $R^2$ ,  $R^4$ ,  $R^5$  and  $R^6$  is a fluorine atom or a fluoroalkyl group in the formula (1a), and in the formula (1b) (i) the ring  $Z^2$  is bonded by a fluorine atom or a fluoroalkyl group, or (ii)  $R^3$  is a fluoroalkyl group.

2. A fluorine-atom-containing polymerizable unsaturated-monomer according to Claim 1, wherein neither of adjacent carbon atoms to the carbon atom bonded by an RO- group has a fluorine atom in the formula (1a) or the formula (1b).

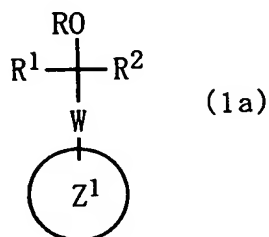
3. A fluorine-atom-containing polymerizable unsaturated-monomer according to Claim 1 or Claim 2, wherein, in the formula (1a),  
 (i) the ring  $Z^1$  is bonded by a fluorine atom or a fluoroalkyl group;  
 (ii) at least one of  $R^1$  and  $R^2$  is a fluoroalkyl group having a hydrogen atom at 1st position;  
 (iii) both of  $R^1$  and  $R^2$  are alkyl groups which have a hydrogen atom at 1st position and may be fluorinated; or  
 (iv) at least one of  $R^1$  and  $R^2$  is an alkyl group of which a carbon number is three or more and may be fluorinated.

4. A fluorine-atom-containing polymerizable unsaturated-monomer according to any one of claims 1 to 3, wherein the ring  $Z^1$  or the ring  $Z^2$  is a ring represented by the following formula (3a), (3b) or (3c);

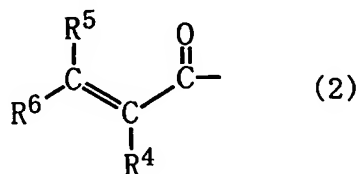


wherein  $Y^1$  is an alkylene group, an oxygen atom or a sulfur atom, each of  $Y^2$  and  $Y^3$  is an alkylene group, an oxygen atom, a sulfur atom or non bonding, each of  $k$  and  $n$  denotes an integer of 0 to 3,  $m$  denotes 1 or 2, and an atom constituting the rings in the formulae may have a substituent.

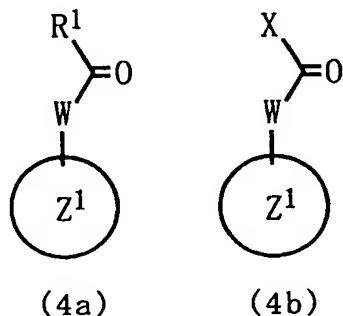
5. A process for producing a fluorine-atom-containing polymerizable unsaturated-monomer wherein a compound represented by the following formula (1a):



wherein each of the ring  $Z^1$  is an alicyclic carbon ring,  $R^1$  is an alkyl group or a fluoroalkyl group,  $R^2$  is an alkyl group or a fluoroalkyl group,  $R$  is an unsaturated acyl group represented by the following formula (2):



wherein each of  $R^4$ ,  $R^5$  and  $R^6$  is a hydrogen atom, a fluorine atom, an alkyl group or a fluoroalkyl group; and W is the same as above; provided that, when a compound represented by the formula (4b) is used as a raw material,  $R^1 = R^2$ ; and a carbon atom bonded by at least one hydrogen atom exists in an adjacent position to the carbon atom bonded by an RO- group; is obtained by allowing a compound represented by the following formula (4a) or (4b):



wherein a ring  $Z^1$  is the same as above; when the alicyclic carbon ring is multi-cyclic, a part of atoms constituting the ring may be substituted by an oxygen atom, a sulfur atom or a nitrogen atom; an atom constituting the ring  $Z^1$  may have a substituent;  $R^1$  is the same as above; X is a halogen atom; W denotes a single bond or a combining group; to react with a (fluoro) alkylating agent represented by the following formula (5):



wherein  $R^2$  is the same as above; M is a metal atom or a  $-MgX^1$  group, wherein  $X^1$  is a halogen atom; provided that a carbon

atom bonded by at least one hydrogen atom exists in a adjacent position to a carbonyl group in the above formula (4a) or (4b), or in 1st position of  $R^2$  in the formula (5);

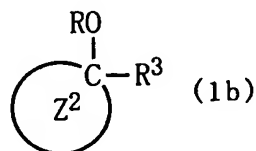
and allowing an acyl halide represented by the following

5 formula (6) to react to the obtained reaction product:



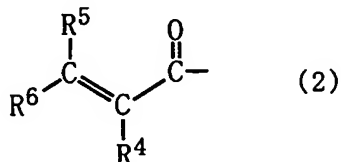
wherein R is the same as above; and  $X^2$  is a halogen atom; provided that at least one of  $R^1$ ,  $R^2$ ,  $R^4$ ,  $R^5$  and  $R^6$  is a fluorine atom or a fluoroalkyl group.

10 6. A process for producing a fluorine-atom-containing polymerizable unsaturated-monomer wherein a compound represented by the following formula (1b):



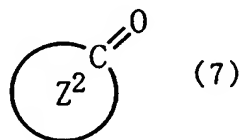
wherein the ring  $Z^2$  is an alicyclic carbon ring; when the alicyclic carbon ring is multi-cyclic, a part of atoms constituting the ring may be substituted by an oxygen atom, a sulfur atom or a nitrogen atom; an atom constituting the ring  $Z^2$  may have a substituent,  $R^3$  is an alkyl group or a fluoroalkyl group, and R is an unsaturated acyl group represented by the

20 following formula (2):

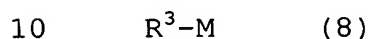


wherein each of  $R^4$ ,  $R^5$  and  $R^6$  is a hydrogen atom, a fluorine atom, an alkyl group or a fluoroalkyl group; and a carbon atom bonded by at least one hydrogen atom exists in an adjacent position to the carbon atom bonded by an  $RO-$  group;

5 is obtained by allowing a carbonyl compound represented by the following formula (7):



wherein a ring  $Z^2$  is the same as above, to react with a (fluoro) alkylating agent represented by the following formula (8):



wherein  $R^3$  is the same as above; M is a metal atom or a  $-MgX^1$  group, wherein  $X^1$  is a halogen atom; provided that a carbon atom bonded by at least one hydrogen atom exists in a adjacent position to a carbonyl group in the above formula (7) or in  
15 1st position of  $R^3$  in the formula (8);

and allowing an acyl halide represented by the following formula (6) to react to the obtained reaction product:



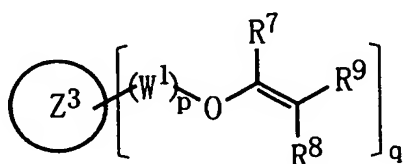
wherein R is the same as above; and  $X^2$  is a halogen atom.

20 7. A polymeric compound having a repeated unit corresponding to a fluorine-atom-containing polymerizable unsaturated-monomer described in any one of claims 1 to 4.

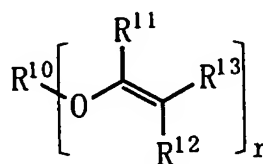
8. A polymeric compound according to Claim 7, wherein

a repeated unit having a substrate-adhesive function and/or a hydrophilic function is contained.

9. A polymeric compound according to Claim 7, wherein a repeated unit corresponding to a vinyl ether monomer represented by the following formula (9a) or (9b):

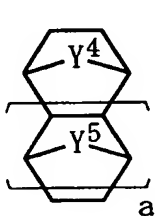


(9a)

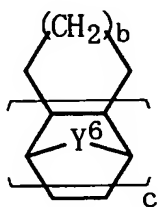


(9b)

wherein, in the formula (9a), the ring  $Z^3$  is one of rings represented by the following formula (10a), (10b), (10c), (10d), (10e), (10f), (10g), (10h) or (10i):



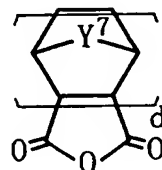
(10a)



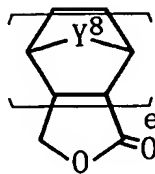
(10b)



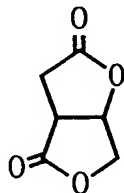
(10c)



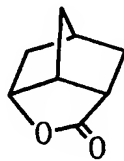
(10d)



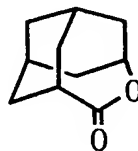
(10e)



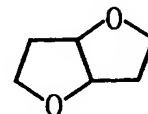
(10f)



(10g)



(10h)



(10i)

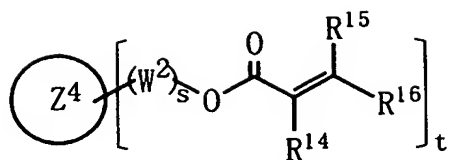
10

wherein  $Y^4$  is an alkylene group, an oxygen atom or a sulfur atom; each of  $Y^5$ ,  $Y^6$ ,  $Y^7$  and  $Y^8$  is an alkylene group, an oxygen

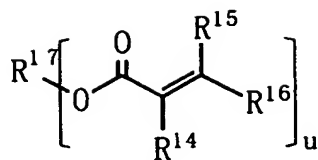
atom, sulfur atom or non-bonding; each of a, c, d and e denotes an integer of 0 to 3; b denotes 1 or 2; and rings of the formulae may have a substituent;  $W^1$  is a bivalent hydrocarbon group; each of  $R^7$ ,  $R^8$  and  $R^9$  is identical to or different from a hydrogen atom or an organic group; at least two of a ring  $Z^3$ ,  $W^1$ ,  $R^7$ ,  $R^8$  and  $R^9$  may be combined together to constitute a ring with one or two or more adjacent atoms; p denotes 0 or 1 and q denotes an integer 1 to 8; when q is 2 or more, each of groups in q pairs of brackets may be identical to or different from; in the formula (9b),  $R^{10}$  is an alkyl group which may have a substituent and each of  $R^{11}$ ,  $R^{12}$  and  $R^{13}$  is identical to or different from a hydrogen atom or an organic group; at least two of  $R^{10}$ ,  $R^{11}$ ,  $R^{12}$  and  $R^{13}$  may be combined together to constitute a ring with one or two or more adjacent atoms; r denotes an integer of 1 to 8; when r is 2 or more, each of groups in r pairs of brackets may be identical to or different from; is contained.

10. A polymeric compound according to Claim 7 or 9, wherein a repeated unit corresponding to an acryl monomer represented by the following formula (11a), (11b), (11c) or (11d):

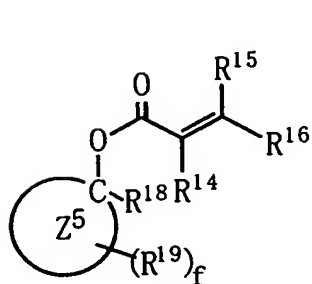




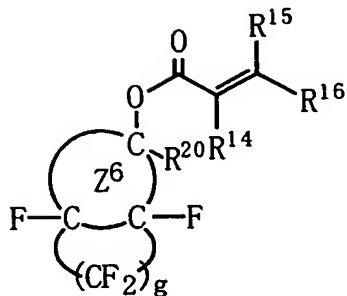
(11a)



(11b)

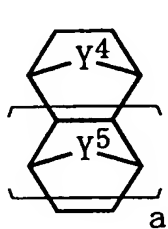


(11c)

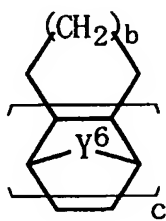


(11d)

wherein, in the formula (11a), the ring  $Z^4$  is one of rings represented by the following formula (10a), (10b), (10c), (10d), (10e), (10f), (10g), (10h) or (10i):



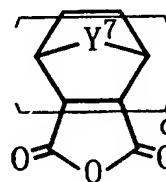
(10a)



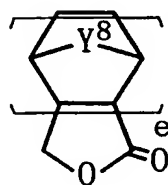
(10b)



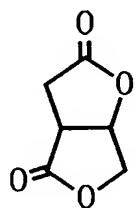
(10c)



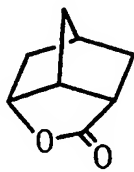
(10d)



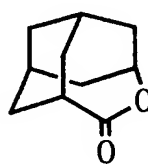
(10e)



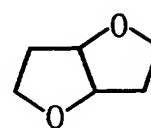
(10f)



(10g)



(10h)



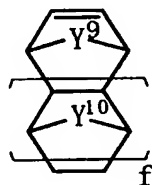
(10i)

wherein  $Y^4$  is an alkylene group, an oxygen atom or a sulfur atom; each of  $Y^5$ ,  $Y^6$ ,  $Y^7$  and  $Y^8$  is an alkylene group, an oxygen atom, sulfur atom or non-bonding; each of a, c, d and e denotes an integer of 0 to 3; b denotes 1 or 2; and rings of the formulae  
5 may have a substituent;  $W^2$  is a bivalent hydrocarbon group; provided that each of  $Z^4$  and  $W^2$  does not have a fluorine atom or a fluoroalkyl group as a substituent; each of  $R^{14}$ ,  $R^{15}$  and  $R^{16}$  is a hydrogen atom, a fluorine atom, an alkyl group or a fluoroalkyl group; s denotes 0 or 1 and t denotes an integer  
10 of 1 to 8; when t is 2 or more, each of groups in t pairs of brackets may be identical to or different from; in the formula (11b),  $R^{17}$  is an alkyl group which may have a substituent and each of  $R^{14}$ ,  $R^{15}$  and  $R^{16}$  is the same as above; u denotes an integer of 1 to 8; when u is 2 or more, each of groups in u pairs of  
15 brackets may be identical to or different from; in the formula (11c), a ring  $Z^5$  is an alicyclic carbon ring which may have a substituent;  $R^{18}$  is a hydrogen atom, a fluorine atom, an alkyl group or a fluoroalkyl group and  $R^{19}$  is a fluoroalkyl group; each of  $R^{14}$ ,  $R^{15}$  and  $R^{16}$  is the same as above; f denotes an integer  
20 of 1 to 6; in the formula (11d), a ring  $Z^6$  is an alicyclic carbon ring which may have a substituent;  $R^{20}$  is a hydrogen atom, a fluorine atom, an alkyl group or a fluoroalkyl group; each of  $R^{14}$ ,  $R^{15}$  and  $R^{16}$  is the same as above; g denotes 3 or 4; provided that compounds represented by the formulae (1a) and (1b) are  
25 excepted for;

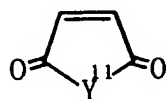
is contained.

11. A polymeric compound according to any one of claims 7, 9 and 10, wherein a repeated unit corresponding to a cyclic unsaturated monomer represented by the following formula (12a)

5 or (12b);



(12a)



(12b)

wherein each of Y9 and Y10 is an alkylene group, an oxygen atom, a sulfur atom or a non-bonding; Y11 is an oxygen atom or a -NH-group; f denotes an integer of 0 to 3; an atom constituting  
10 a ring of the formulae may have a substituent.

12. A photoresist resin composition, comprising at least the polymeric compound as claimed in any one of claims 7 to 11 and a photo acid generator.

13. A process of producing a semiconductor, comprising  
15 the steps of applying the photoresist resin composition as claimed in claim 12 onto a base or substrate to form a resist film, exposing, developing and thereby produce a pattern.